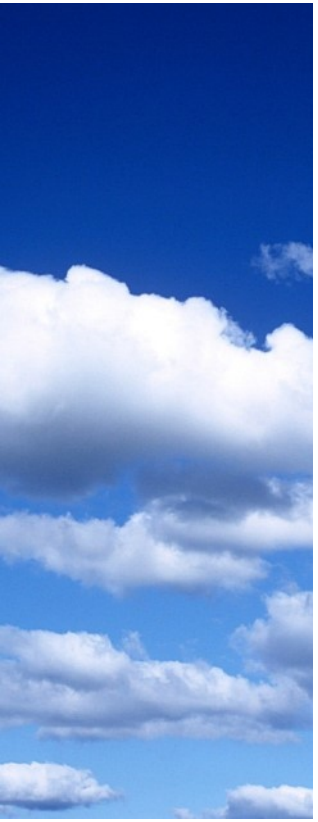


REVIEW OF OPERABLE UNIT 3 FOCUSED FEASIBILITY STUDY REPORT

RINGWOOD MINES/LANDFILL SUPERFUND SITE

DECEMBER 13, 2018

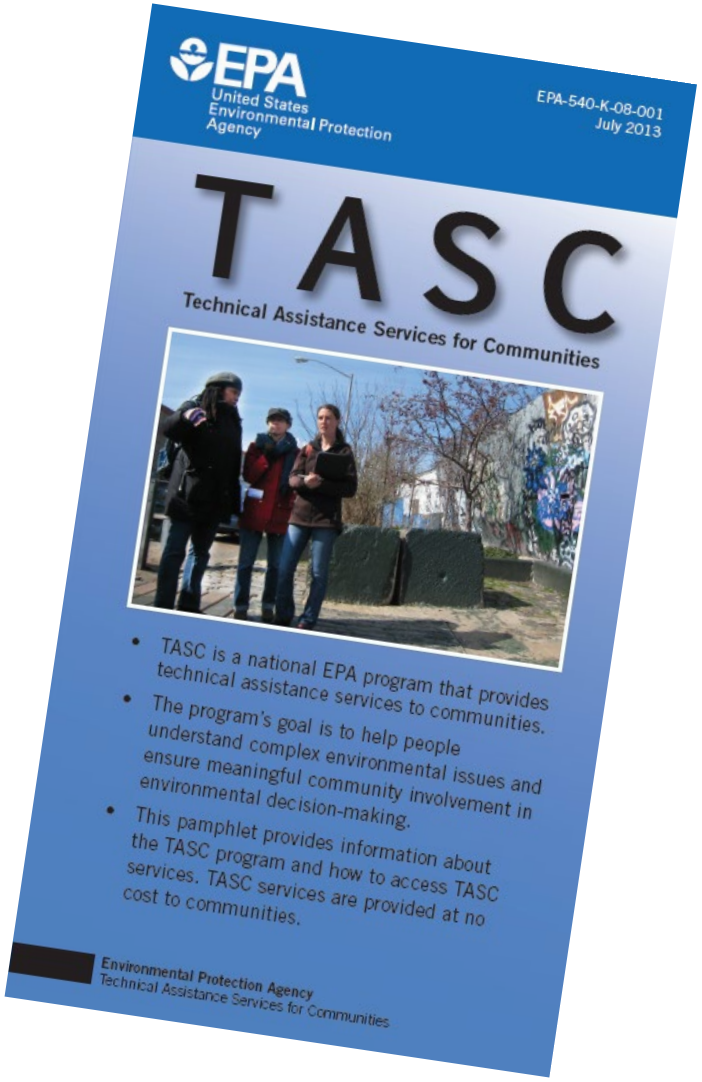
AGENDA

- TASC
- Site Background and the Superfund Process
- OU3 Focused Feasibility Study Report Summary
- TASC Comments

TASC

TASC

- Technical Assistance Services for Communities (TASC)
- Provides non-advocacy, independent technical assistance
- This presentation is funded by EPA's TASC program – its contents do not necessarily reflect the policies, actions or positions of EPA



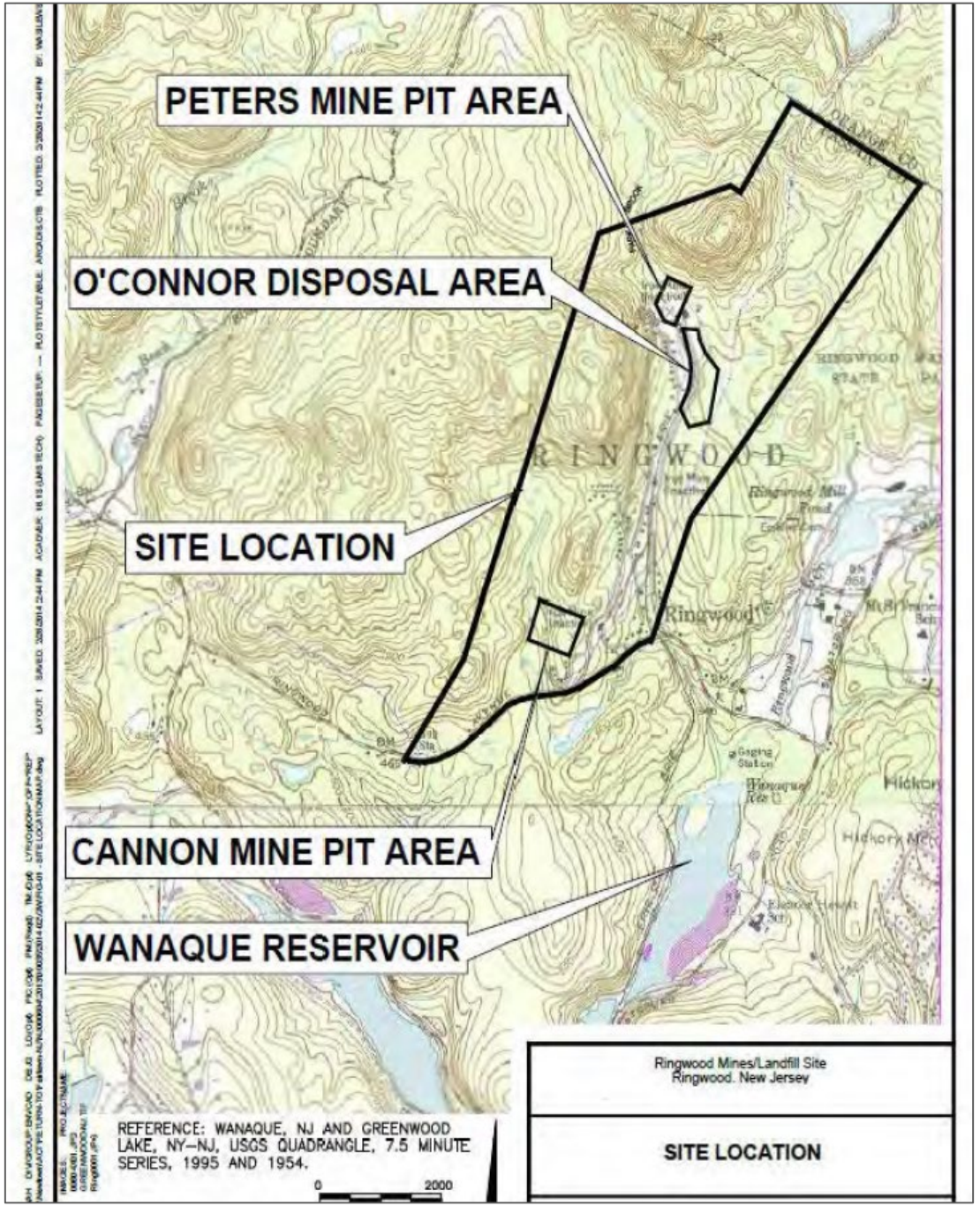
SITE BACKGROUND AND THE SUPERFUND PROCESS

SITE BACKGROUND

- 500-acre site is in historic iron-mining district
- Ford disposed of paint sludge and other wastes in late 1960s and early 1970s
- Operable units (OUs):
  - OU1 = originally intended to address entire site
  - OU2 = land areas of concern – Peters Mine Pit (PMP) Area, O'Connor Disposal Area (OCDA) and Cannon Mine Pit (CMP) Area
  - OU3 = Sitewide groundwater and St. George Pit Area
- Primary contaminants of concern (COPCs): benzene, chloroethane, 1,4-dioxane, arsenic and lead

Ringwood Mines/Landfill Site Location

(Figure 1, Site's 2014 Record of Decision)

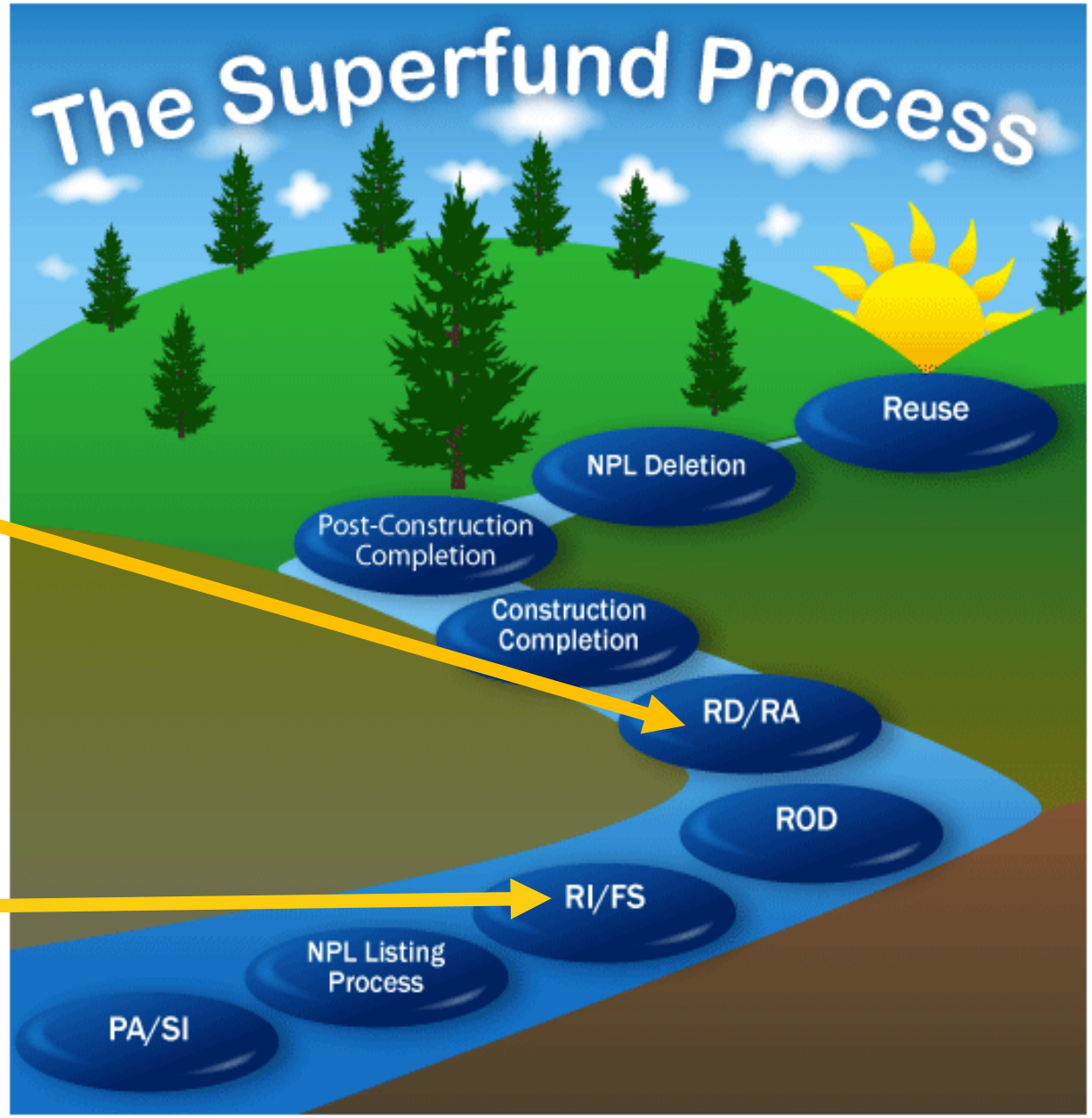


NORTH

Groundwater flow is generally down valley to the south and southeast

Operable Unit 2 (OU2)
Remedial Design (RD)
completed

Operable Unit 3 (OU3)
Site-Related Groundwater
Focused Feasibility Study
(FFS)
completed



EVALUATION OF REMEDIAL ALTERNATIVES

- Presented in the FFS Report
- EPA must consider nine evaluation criteria

THRESHOLD CRITERIA

1. Overall protection of human health and the environment
2. Compliance with applicable or relevant and appropriate requirements (ARARs)

Performance

BALANCING CRITERIA

3. Long-term effectiveness and permanence
4. Reduction in toxicity, mobility or volume
5. Short-term effectiveness
6. Implementability
7. Cost

MODIFYING CRITERIA

8. State acceptance
9. Community acceptance

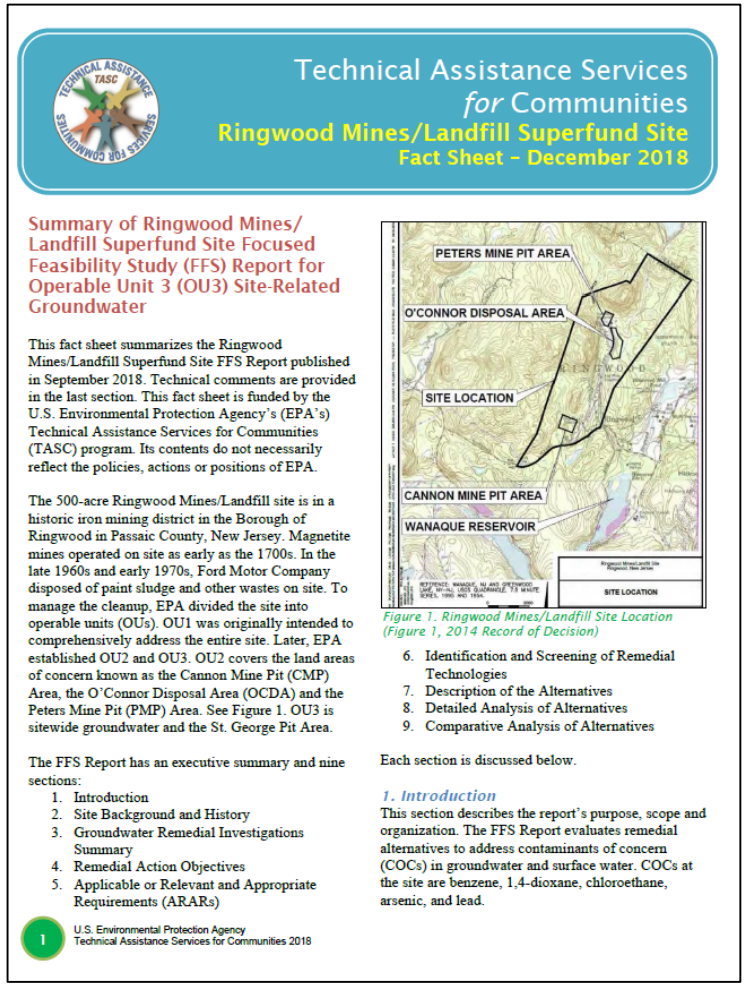
NEXT STEPS

- EPA will select a preferred remedy and explain it in a Proposed Plan
- There will be a public comment period for the Proposed Plan
- EPA may choose to modify the preferred remedy based on state and community input
- EPA will then write a Record of Decision (ROD)
- After the ROD is issued, the remedial design will begin

OU3 FOCUSED FEASIBILITY STUDY REPORT

SUMMARY OF OU3 FOCUSED FEASIBILITY STUDY REPORT

1. Introduction
2. Site Background and History
3. Groundwater Remedial Investigations Summary
4. Remedial Action Objectives
5. Applicable or Relevant and Appropriate Requirements (ARARs)
6. Identification and Screening of Remedial Technologies
7. Description of the Alternatives
8. Detailed Analysis of Alternatives
9. Comparative Analysis of Alternatives



Technical Assistance Services *for* Communities

Ringwood Mines/Landfill Superfund Site

Fact Sheet – December 2018

Summary of Ringwood Mines/ Landfill Superfund Site Focused Feasibility Study (FFS) Report for Operable Unit 3 (OU3) Site-Related Groundwater

This fact sheet summarizes the Ringwood Mines/Landfill Superfund Site FFS Report published in September 2018. Technical comments are provided in the last section. This fact sheet is funded by the U.S. Environmental Protection Agency's (EPA's) Technical Assistance Services for Communities (TASC) program. Its contents do not necessarily reflect the policies, actions or positions of EPA.

The 500-acre Ringwood Mines/Landfill site is in a historic iron mining district in the Borough of Ringwood in Passaic County, New Jersey. Magnetite mines operated on site as early as the 1700s. In the late 1960s and early 1970s, Ford Motor Company disposed of paint sludge and other wastes on site. To manage the cleanup, EPA divided the site into operable units (OUs). OU1 was originally intended to comprehensively address the entire site. Later, EPA established OU2 and OU3. OU2 covers the land areas of concern known as the Cannon Mine Pit (CMP) Area, the O'Connor Disposal Area (OCDA) and the Peters Mine Pit (PMP) Area. See Figure 1. OU3 is sitewide groundwater and the St. George Pit Area.

The FFS Report has an executive summary and nine sections:

1. Introduction
2. Site Background and History
3. Groundwater Remedial Investigations Summary
4. Remedial Action Objectives
5. Applicable or Relevant and Appropriate Requirements (ARARs)

Figure 1. Ringwood Mines/Landfill Site Location (Figure 1, 2014 Record of Decision)

6. Identification and Screening of Remedial Technologies
7. Description of the Alternatives
8. Detailed Analysis of Alternatives
9. Comparative Analysis of Alternatives

Each section is discussed below.

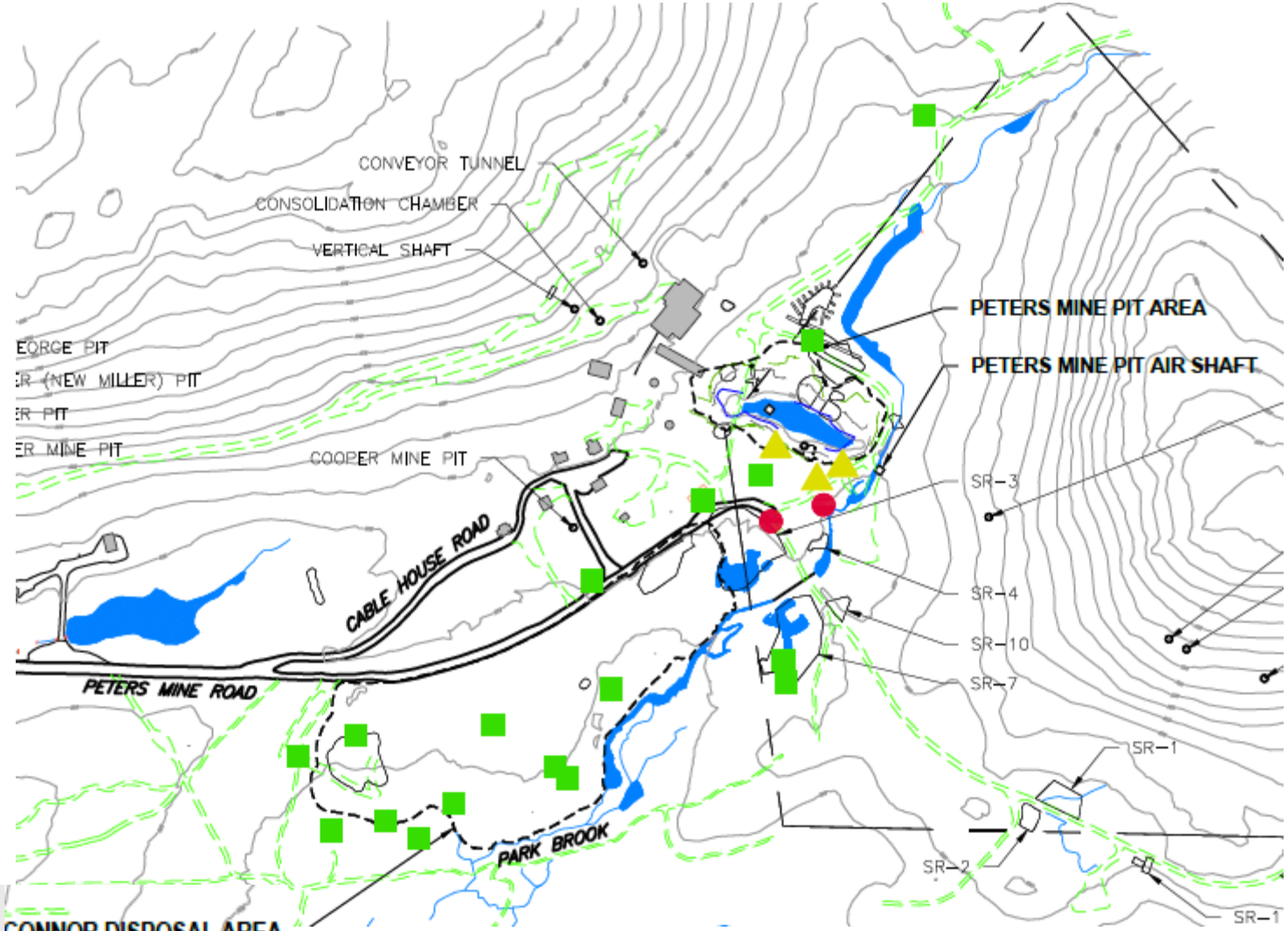
1. Introduction

This section describes the report's purpose, scope and organization. The FFS Report evaluates remedial alternatives to address contaminants of concern (COCs) in groundwater and surface water. COCs at the site are benzene, 1,4-dioxane, chloroethane, arsenic, and lead.

CONTAMINANTS OF CONCERN

- Benzene, a volatile organic compound
- Chloroethane , a volatile organic compound
- 1,4-Dioxane
- Arsenic
- Lead

August 2016 – Benzene in Overburden



- Greater than GWQS
- Less than GWQS
- Undetected

GWQS = Ground Water Quality Standard

N

General direction of groundwater flow

Figure 5 FFS; Figure 6 shows chloroethane greater than GWQS in same two PMP Area wells

August 2016 – Benzene in Bedrock

Groundwater flow directions from CMP ridge (fig. 3 of FFS)

General direction of groundwater flow

- Greater than GWQS
- Less than GWQS
- Undetected

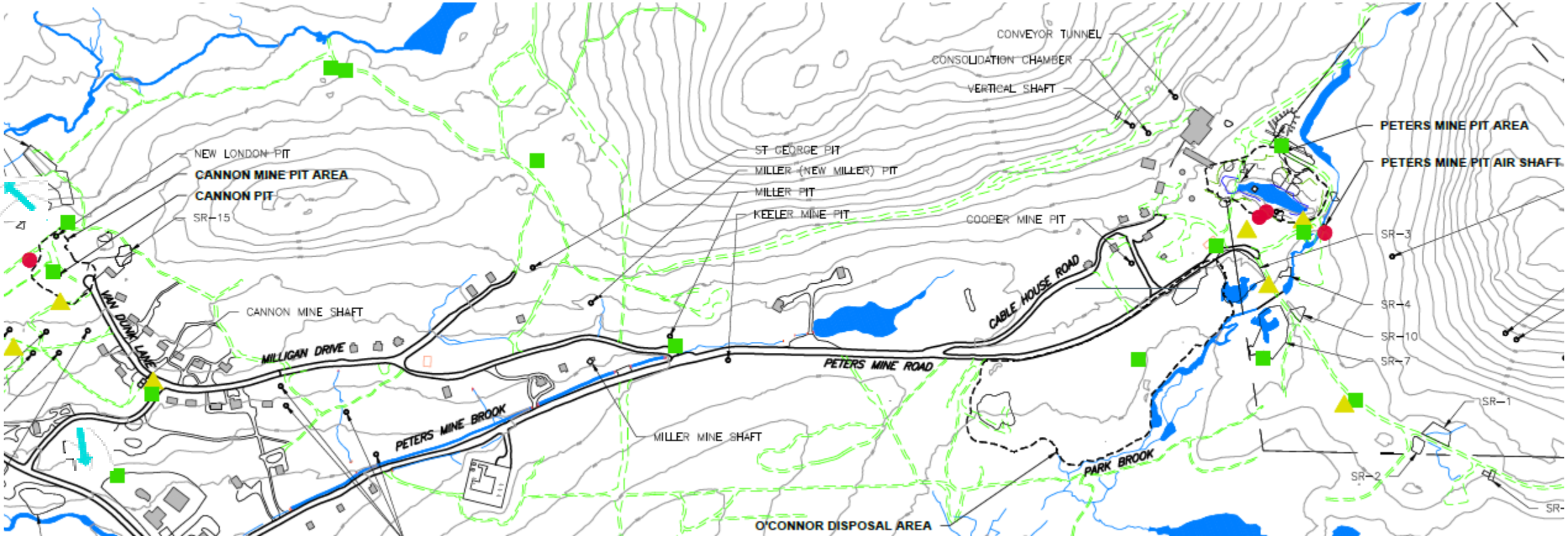
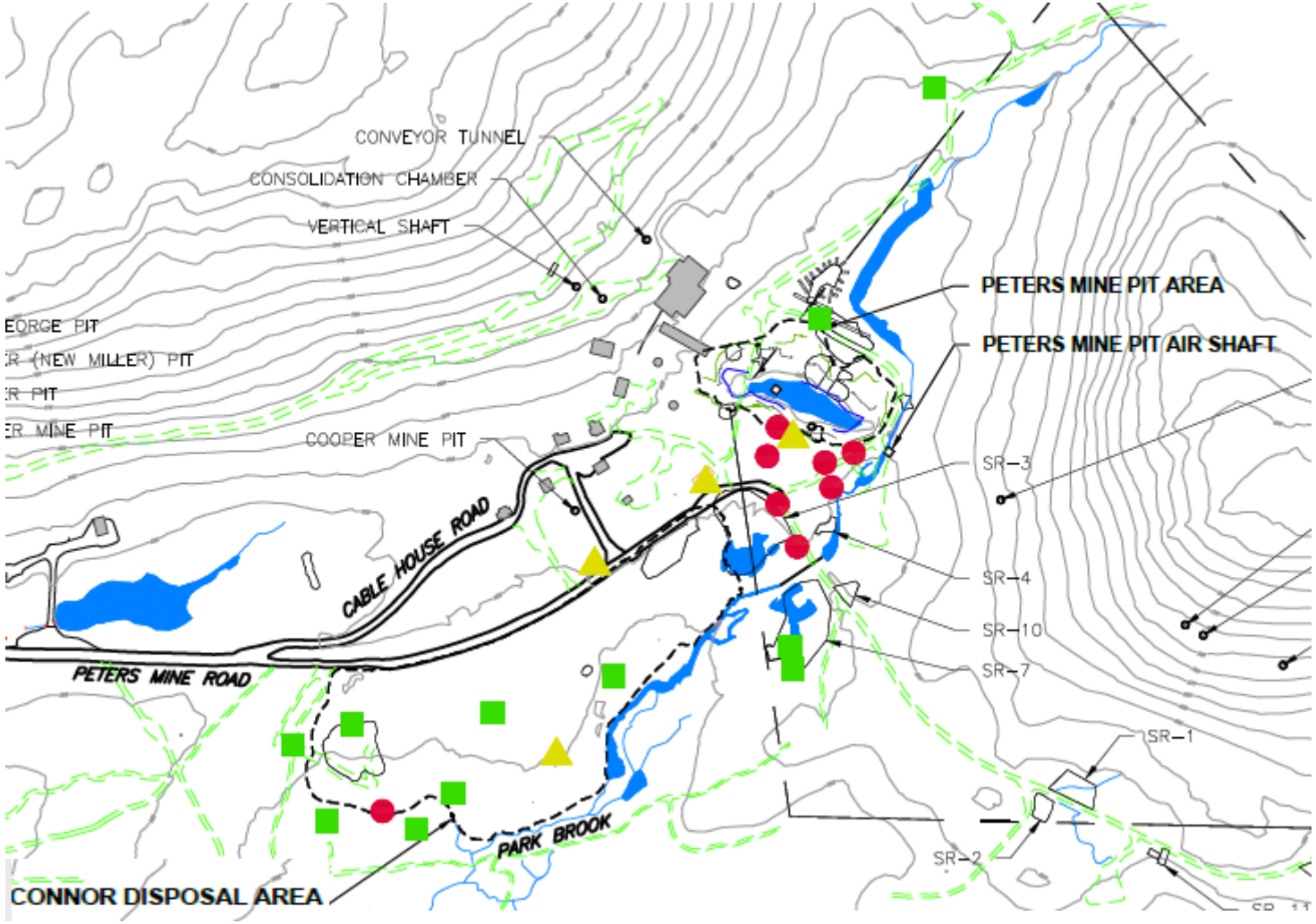


Figure 10 of FFS; Figure 11 shows chloroethane greater than GWQS in same two PMP Area wells, but not in CMP Area

August 2016 – 1,4-Dioxane in Overburden



- Greater than GWQS
- Less than GWQS
- Undetected

N

General direction of groundwater flow

Figure 7 of FFS

August 2016 – 1,4-Dioxane in Bedrock

General direction of groundwater flow

- Greater than GWQS
- Less than GWQS
- Undetected

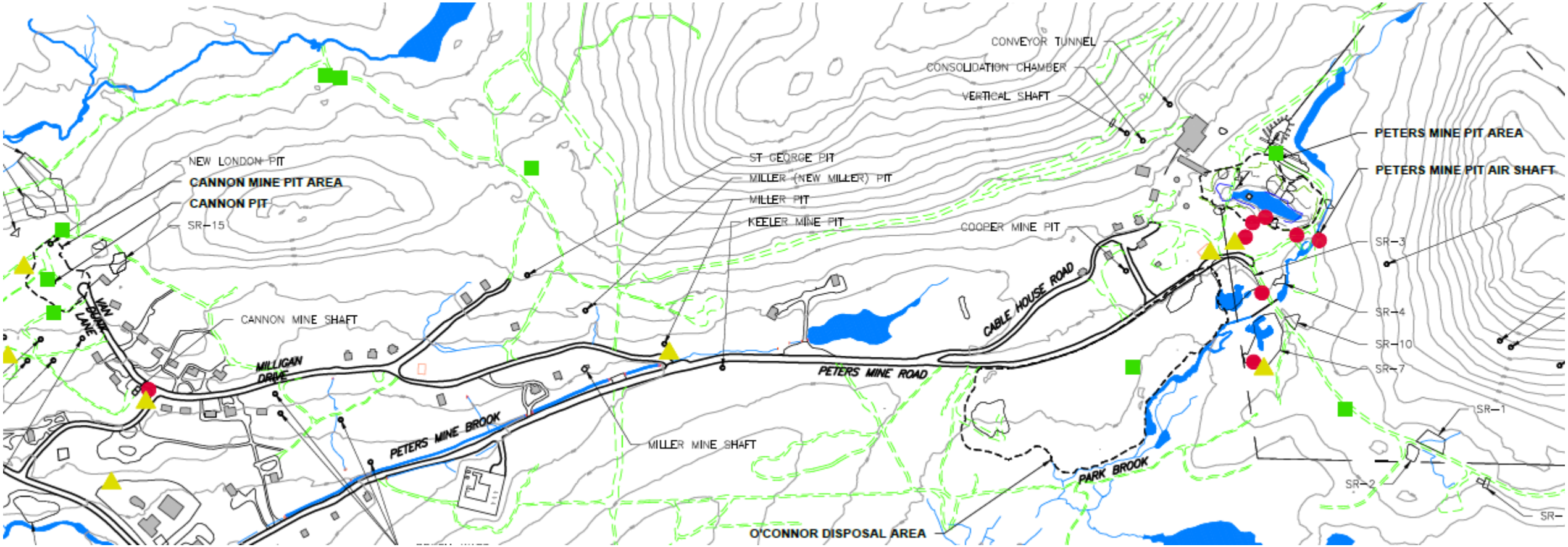
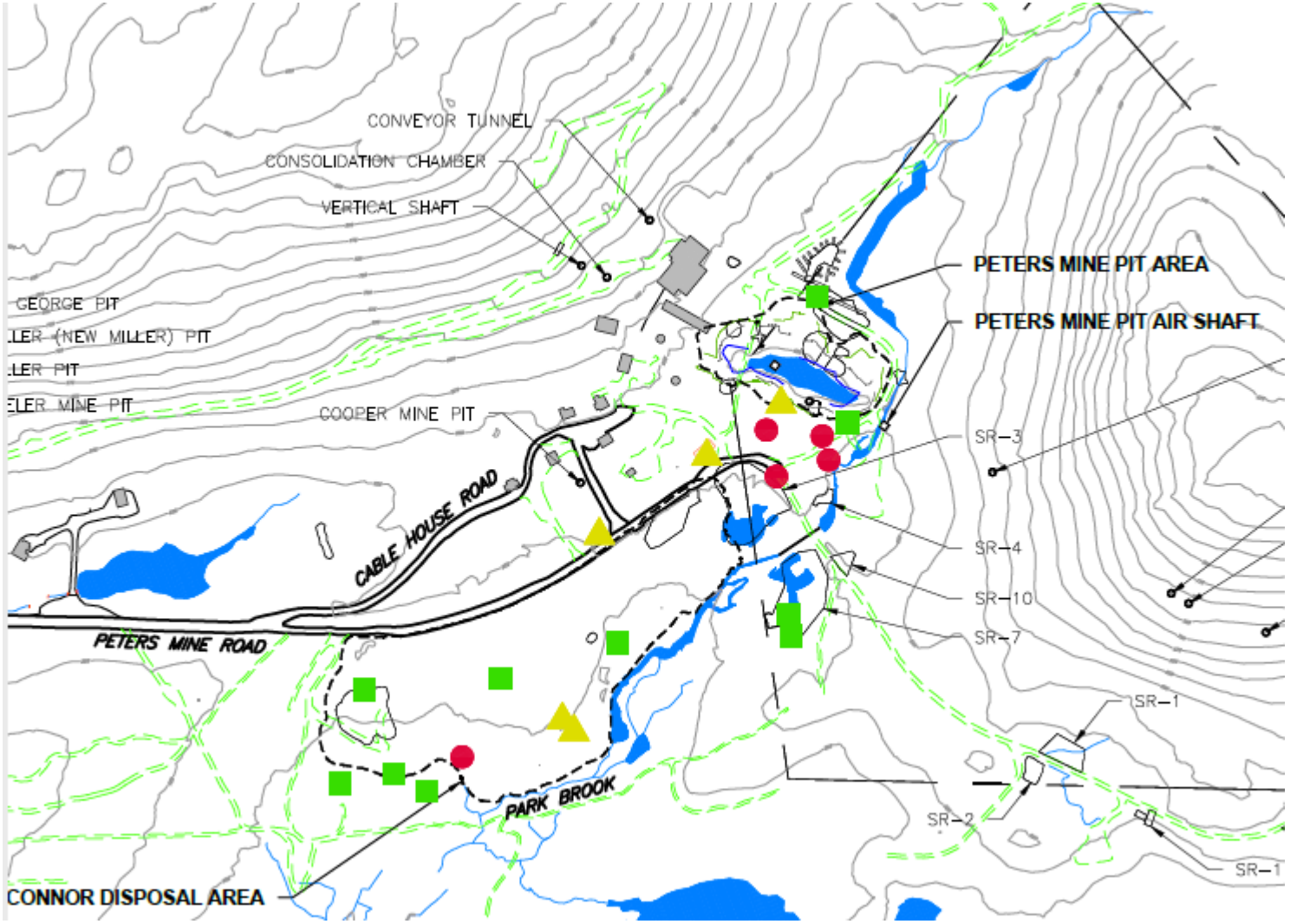


Figure 12 of FFS

August 2016 – Arsenic in Overburden



- Greater than GWQS
- Less than GWQS
- Undetected

N

General direction of groundwater flow

Figure 8 of FFS

August 2016 – Arsenic in Bedrock

General direction of groundwater flow

- Greater than GWQS
- Less than GWQS
- Undetected

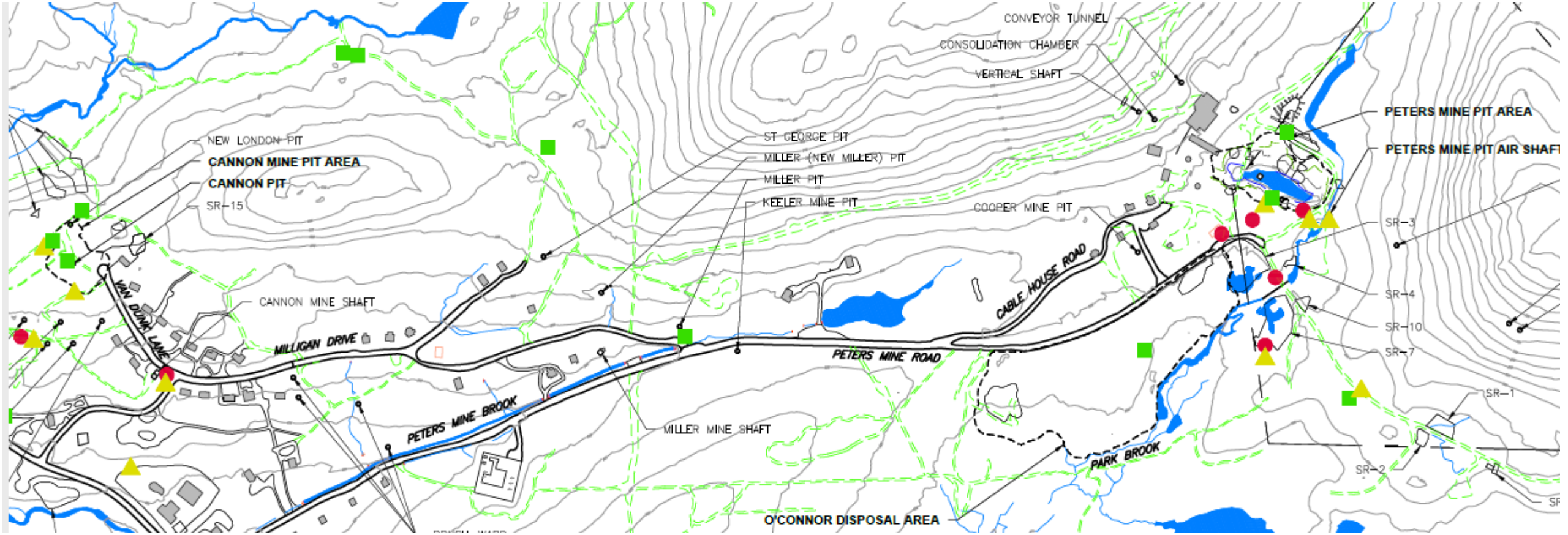
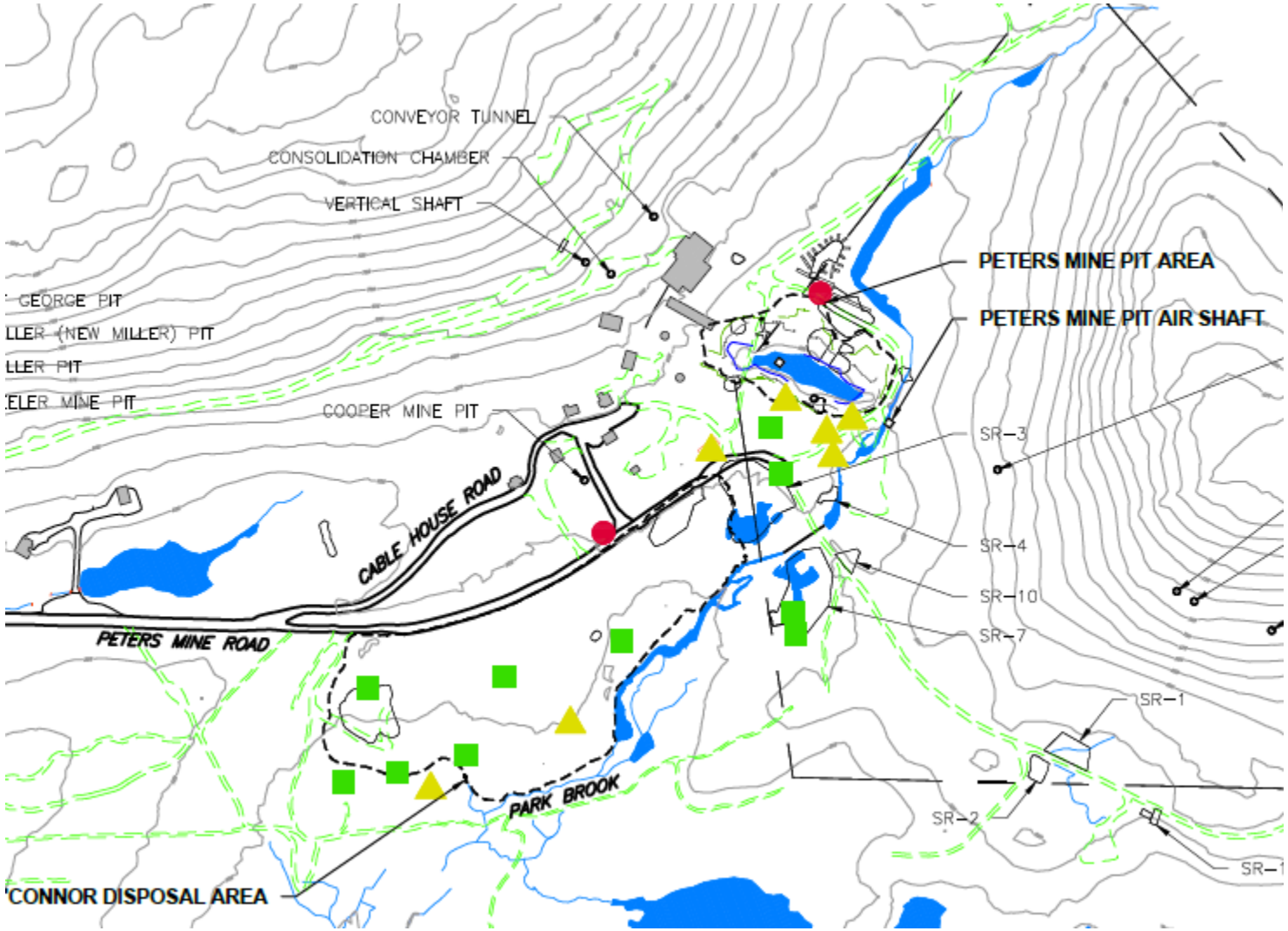


Figure 13 of FFS

August 2016 – Lead in Overburden



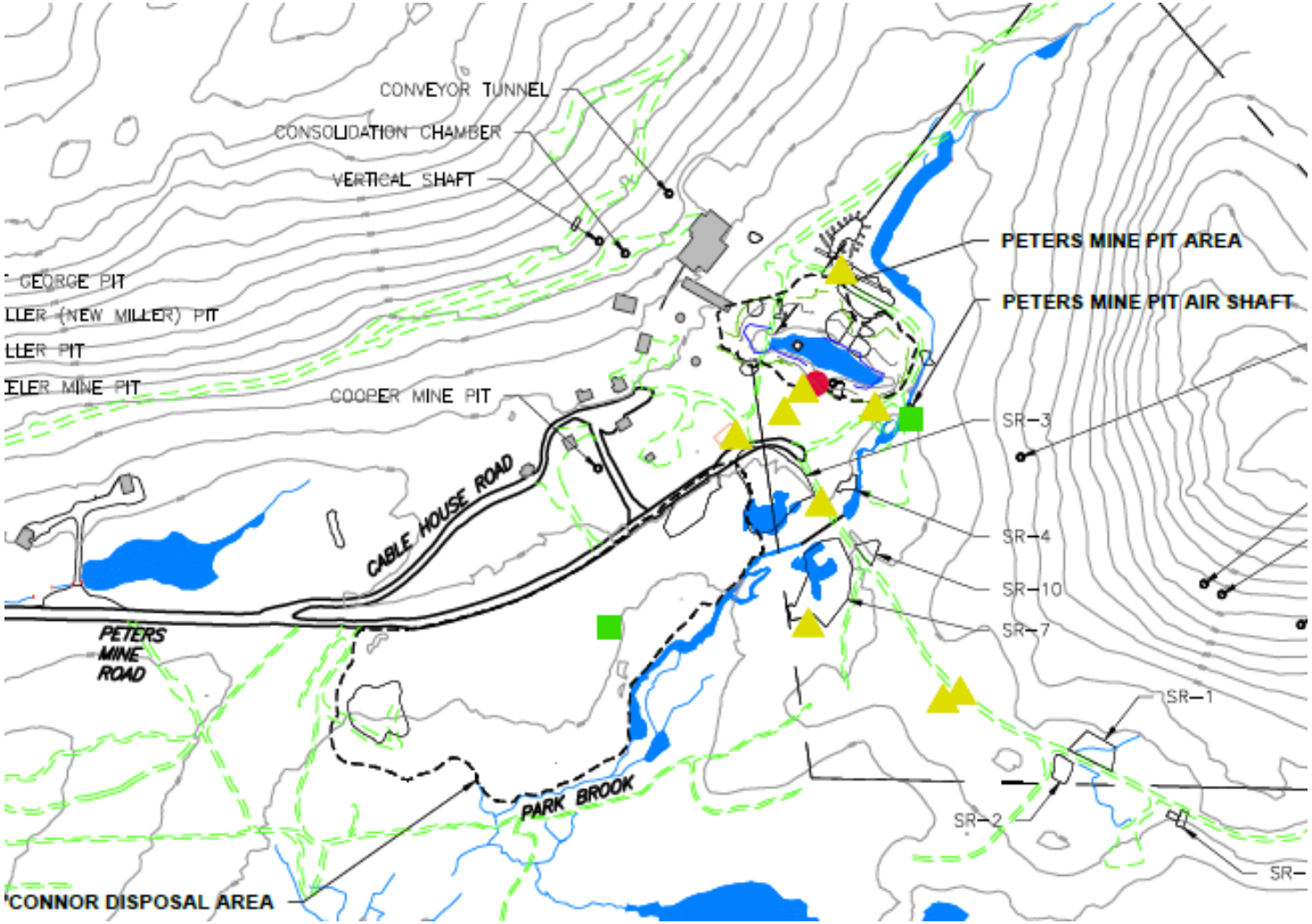
- Greater than GWQS
- Less than GWQS
- Undetected

N

General direction of groundwater flow

Figure 9 of FFS

August 2016 – Lead in Bedrock



- Greater than GWQS
- Less than GWQS
- Undetected

N

General direction of groundwater flow

Figure 14 of FFS

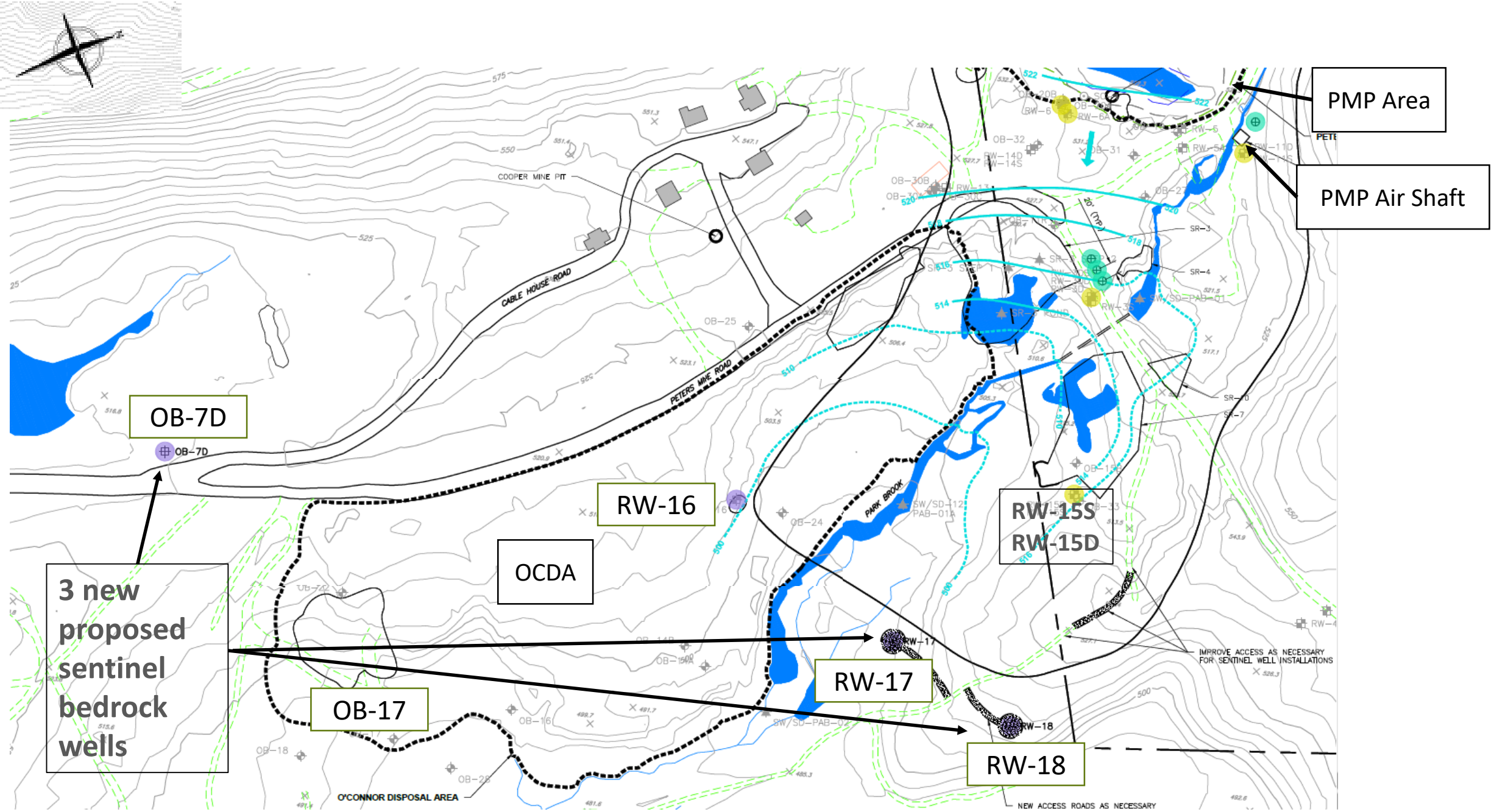


Figure 26 of FFS

MEMORANDUM OF CANDIDATE TECHNOLOGIES

- Purpose
  - Identify candidate remedial action technologies and approaches for OU3 Site-Related Groundwater to be further considered in focused feasibility study (FFS)
- TASC reviewed with CAG on February 8, 2018

REMEDIAL ALTERNATIVES EVALUATED

Sitewide Groundwater

1. No Action
2. Monitored Natural Attenuation (MNA) with a Classification Exception Area (CEA)/Well Restriction Area (WRA)

Sitewide Groundwater Focused on Combined PMP Area and OCDA

3. Enhanced MNA Treatment Barrier with a CEA/WRA

PMP Air Shaft

4. No Action
5. Oxygen Diffusion via Chemical Addition
6. Treatment/Closure

MNA – ALTERNATIVES 2 AND 3

- Natural processes decrease or “attenuate” concentrations of contaminants in soil and groundwater

- Scientists monitor these conditions to make sure natural attenuation is working

Monitoring well

CEA/WRA – ALTERNATIVES 2 AND 3

- Classification Exception Area/Well Restriction Area (CEA/WRA) is an institutional control
  - A notice by NJDEP of groundwater pollution in a localized area caused by a discharge at a contaminated site
  - A restriction on the use of groundwater
  - Part of a remedial action for groundwater that does not meet NJDEP groundwater quality standards

TREATMENT BARRIER – ALTERNATIVE 3

- Enhanced MNA
  - Includes placing solid oxygen releasing compound (ORC) and possibly a nutrient (nitrogen) in groundwater wells
    - To enhance benzene biodegradation
    - Could also enhance 1,4-dioxane biodegradation if right microorganisms are present
  - Wells would be downgradient of PMP Area and PMP Air Shaft where COCs have been highest
    - Spaced 20 feet apart in upper aquifer, next to gravel access road

OXYGEN DIFFUSION VIA CHEMICAL ADDITION – ALTERNATIVE 5

- Similar to Alternative 3
  - Includes placing solid oxygen releasing compound (ORC) and possibly a nutrient (nitrogen) in PMP Air Shaft
    - To enhance benzene biodegradation
    - Could also enhance 1,4-dioxane biodegradation if the right microorganisms are present
  - Monitoring would assess the effect of increased oxygen on benzene and 1,4-dioxane concentrations

PMP AIR SHAFT TREATMENT AND CLOSURE – ALTERNATIVE 6

- Permanently close PMP Air Shaft using conventional mine shaft closure technology
  - Includes placing granular activated carbon (GAC) at the base of the air shaft to adsorb benzene
  - Includes placing resin at the base of the air shaft to adsorb 1,4-dioxane

SITE-WIDE GROUNDWATER REMEDIAL ALTERNATIVES

Alternative	Overall Protection	Compliance with ARARs	Long-term Effectiveness	Reduction in Toxicity, Mobility or Volume	Short-term Effectiveness	Implement-ability	Cost
1. No Action	currently protective	complies through CEA/WRA	effective through CEA/WRA	none	no impacts; up to two months to implement	readily implemented	$622,000
2. MNA with CEA/WRA	currently protective; more robust future protection	designed to meet GWQSs over time	effective through CEA/WRA	reduces toxicity and mobility of COCs	no significant impacts; six months to construct	readily implemented	$1,439,000
3. Enhanced MNA Treatment Barrier with CEA/WRA	currently protective; more robust future protection	designed to meet GWQSs over time	effective through CEA/WRA	possible greater reduction than Alternative #2	no significant impacts; about 12 to 18 months to construct	readily implemented	$2,815,000

PMP AIR SHAFT REMEDIAL ALTERNATIVES

Alternative	Overall Protection	Compliance with ARARs	Long-term Effectiveness	Reduction in Toxicity, Mobility or Volume	Short-term Effectiveness	Implement-ability	Cost
4. No Action	currently protective	not applicable	not a permanent remedy	none	none	not a consideration	None
5. Oxygen Diffusion via Chemical Addition	currently protective	would comply through equivalent permit process	not a permanent remedy; ORC could be used long term	would reduce toxicity and volume by biodegradation	no significant impacts; six to 12 months to construct	readily implemented	$334,000
6. Treatment/ Closure	currently protective	would comply through equivalent permit process	permanent remedy	would reduce COC mobility with GAC and resin	no significant impacts; about 12 to 18 months to construct	readily implemented	$598,000

ORC = oxygen releasing compound

TASC COMMENTS

TASC COMMENTS

- The following technical comments are based on TASC's independent review and are provided for the use of the community
- TASC does not submit comments to EPA on behalf of the community; the comments reflect the opinions of the reviewers and may not reflect EPA policies, actions or positions
- TASC has identified some questions the community may wish to consider asking – these are identified in text boxes on the following slides

USE OF SITE GROUNDWATER

- The report references a 2016 EPA fact sheet in stating that groundwater is not used for potable or domestic purposes

- The CAG may want to confirm with EPA that site groundwater is still not being used

ADDITIONAL MONITORING

- Additional monitoring locations could be added
  - RW-9A
  - SR-3 Seep 2
  - Additional new well downgradient of well OB-17
  - Additional sentinel wells further downgradient if 1,4-dioxane is found in any new proposed bedrock wells
- The CAG may want to discuss these with EPA

CLARIFICATION FOR WELL OB-18

- It is unclear in the report whether OB-18 is included in the proposed monitoring program

- The CAG may want to confirm with EPA that OB-18 is included

ENHANCED MONITORED NATURAL ATTENUATION TREATMENT BARRIER

- Biodegradation of 1,4-dioxane will only occur if there are bacteria (microorganisms) that can degrade it, as well as oxygen present
- It is not clear which if any commercial additives will promote biodegradation of 1,4-dioxane

- The CAG may want to ask EPA if an appropriate bacterial culture to biodegrade 1,4-dioxane could also be tested along with the ORCs
- The CAG may want to ask EPA if and how commercial additives will be tested for effectiveness

FFS REPORT, FIGURES 5-14

- The report states that the highest concentrations of COCs from two sampling events in 2016 and 2017 are shown on Figures 5 through 14, but the figures indicate that only August 2016 data were used to create the maps

- The CAG may want to ask EPA for clarification regarding the data shown on these figures

FFS REPORT, FIGURES 15 AND 16

- Text on page 21 of the report states that the isoconcentration mapping in these figures shows that COCs are contained on site and do not extend off site in groundwater above their GWQSs; however, it is not completely clear to TASC that this is the case

- The CAG may want to ask EPA to confirm that COCs are contained on site after additional planned bedrock wells are installed and sampled downgradient of RW-15S and RW-15D

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